

South Plains College
Common Course Syllabus: PHYS 1410
Revised 08/25/2021

Department: Science

Discipline: Physics

Course Number: PHYS 1410

Course Title: Elementary Physics

Available Formats: conventional

Campuses: Levelland

Instructor:

David Hobbs

Office: S67

Office Hours: MW 8:30 – 11:00 am, F 8:30 – 11:30 am

Phone: 806-716-2639

email: dhobbs@southplainscollege.edu

Course Description: Conceptual level survey of topics in physics intended for liberal arts and other non-science majors.

Prerequisite: There are no prerequisites for this course, however you will be expected both on the homework and in the exams to be able to perform simple mathematical calculations. Examples of the mathematical concepts we will use in this course are scientific notation, multiplying and dividing powers of 10, converting between different metric units, rearranging and solving simple equations. It will be assumed that you are familiar with high school algebra.

Credit: 4 **Lecture:** 3 **Lab:** 3

Textbook: Conceptual Physics, 12th Edition by Paul G. Hewitt (Pearson, 2015).

This course partially satisfies a Core Curriculum Requirement:

Life and Physical Sciences Foundational Component Area (030)

Core Curriculum Objectives addressed:

- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions
- **Teamwork**—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcomes:

Learning Outcomes - Upon successful completion of this course, students will:

1. Distinguish between displacement, velocity, and acceleration
2. Solve simple problems involving uniform motion, uniformly accelerated motion, or uniform circular motion
3. State Newton's Laws of Motion, explain the meaning of each, and identify applications of each
4. Apply Newton's laws of motion to relate forces to motion for simple physical cases
5. Define momentum and solve simple problems involving conservation of momentum
6. Identify types of energy in a system and solve simple problems involving conservation of energy
7. Describe the basic structure of an atom in terms of protons, neutrons, and electrons
8. Describe the different phases of matter from an atomic perspective
9. Describe how pressure relates to force and determine the pressure at different depths in a fluid
10. Define density and relate it to the buoyant force, applying Archimedes' Principle to solve problems
11. State the first law of thermodynamics and use it to solve simple problems involving energy transfers into or out of a system and changes in the system's internal energy
12. Discuss various means of heat transfer
13. Make simple calculations involving changes in temperature as well as phase changes when systems at different temperatures interact
14. Describe and calculate basic properties of waves such as frequency, wavelength, and amplitude
15. Discuss wave interference and the conditions for constructive and destructive interference
16. Discuss electric charge and the role it plays in atomic structure.
17. Calculate electrical forces using Coulomb's law.
18. Describe electric field and discuss electrical interactions in terms of electric field.
19. Discuss simple electrical circuits and make calculations using Ohm's law applied to series and parallel circuits.
20. Describe magnetic field and discuss interactions of magnetic fields with moving charges.
21. Relate changing magnetic fields to induced electric fields.
22. Discuss the spectrum of electromagnetic waves from radio waves to x-rays.
23. Discuss diffraction and interference and how they arise based on superposition and Huygens' Principle.
24. Make simple calculations related to the photoelectric effect and the Bohr model of the hydrogen atom
25. State the Pauli Exclusion Principle and specify its implications for atomic structure
26. Describe the basic structure of a nucleus and explain the meaning of different isotopes
27. Recall the three basic types of radioactivity and describe some properties of each
28. Use radioactive half-life in simple calculations
29. Describe the basic principles of radioactive dating

Student Learning Outcomes Assessment: Selected questions on the comprehensive final exam will assess how well students have met targeted student learning outcomes.

Course Evaluation: Student grades will be based on daily work (class attendance and participation; reading, homework, and lab assignments), four tests, and a comprehensive final exam. Final grades will be assigned based on overall, weighted average using the weighting scheme shown below:

Task	Code	Weight
Daily Work	D	10%
Tests	T	60%
Final Exam	F	30%

Overall Average = $0.10 \cdot D + 0.60 \cdot T + 0.30 \cdot F$

The letter grades will be based on a fixed scale as follows:

A: 89.5 – 100 B: 79.5 – 89.5 C: 69.5 – 79.5 D: 59.5 – 69.5 F: below 59.5

Borderline cases (within 0.5 points of the break) will be decided based on class participation.

Attendance Policy: Attendance and effort are vital to success in this course. Class attendance keeps you well connected to the course, so that you know at all times what's going on, what are the most important points, etc., and gives you opportunities to ask questions and clear up confusions. Therefore, students are expected to be in attendance for every class session. Attendance and participation in class will contribute to your daily work grade.

Daily Work: Daily work consists of reading assignments and both in-class (lab) and outside-of-class (homework) practice with feedback. These activities are meant to be formative assessments and are graded primarily on participation rather than correctness. Their purpose is to help develop understanding of the concepts and principles and to prepare you for the tests.

Daily Work Grade Determination: Your daily work grade will be determined as follows:

Attendance: 10 points if no more than two absences, 0 points otherwise

Reading: Fraction of reading assignments completed x 37.5 (but no more than 30 points)

Homework: Fraction attempted and corrected x 37.5 (but no more than 30 points)

Lab: Fraction completed x 37.5 (but no more than 30 points)

Example: You have only 1 absence, completed 80% of reading assignments, and completed 75% of both the homework and labs. Your daily work grade would be

$$\text{daily work grade} = 10 + 0.8 \times 37.5 + 0.75 \times 37.5 + 0.75 \times 37.5 = 96.25$$

Notice to earn a 100 on the daily work grade requires no more than two absences and completion of at least 80% of the reading assignments, homework, and lab work.

Tests: Four 75-minute tests will be given during the semester as shown on the course calendar. Students are required to take all four tests; however, the lowest test score will be dropped. There will be no make-up tests given, so a test missed due to an excused absence will be the one dropped. A test missed because of an unexcused absence will receive a grade of zero and cannot be dropped. Absences on a test day must be approved before the class in order to be excused. On class days when a test is scheduled, the test will be given during the first 75 minutes of class, followed by a fifteen-minute break and then lecture for the remainder of the class time. All students will be required to hand in the test at the end of the 75-minute period without exception and the lecture portion of class will begin promptly 15 minutes later.

Final Exam: A comprehensive final exam will be given during the scheduled two-hour final exam time. See the course calendar for the day and time.

Plagiarism and Cheating: Students are expected to do their own work on all projects, quizzes, assignments, examinations, and papers. Failure to comply with this policy will result in an F (grade of zero) for the assignment and can result in an F for the course if circumstances warrant.

Plagiarism violations include, but are not limited to, the following:

1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:

1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning. Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

Diversity Statement: In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Nondiscrimination Policy: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To [activate](#) accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or [email cgilster@southplainscollege.edu](mailto:cgilster@southplainscollege.edu) for assistance.

Covid Statement:

If you are experiencing any of the following symptoms please do not attend class and either seek medical attention or get tested for COVID-19.

- Cough, shortness of breath, difficulty breathing
- Fever or chills
- Muscles or body aches
- Vomiting or diarrhea
- New loss of taste and smell

Please also notify DeEtte Edens, BSN, RN, Associate Director of Health & Wellness, at dedens@southplainscollege.edu or 806-716-2376.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

Calendar

Phys 1410.002

Fall 2021

Week	Tuesday		Thursday	
	Date	Topics	Date	Topics
1	08/31	First day of class	09/02	About Science
2	09/07	Newton's First Law of Motion–Inertia	09/09	Linear Motion
3	09/14	Newton's Second Law of Motion	09/16	Newton's Third Law of Motion
4	09/21	Momentum	09/23	Energy
5	09/28	Rotational Motion	09/30	The Atomic Nature of Matter
6	10/05	Solids	10/07	Liquids
7	10/12	Gases	10/14	Temperature, Heat, and Expansion
8	10/19	Heat Transfer	10/21	Change of Phase
9	10/26	Thermodynamics	10/28	Vibrations and Waves
10	11/02	Electrostatics	11/04	Electric Current
11	11/09	Magnetism	11/11	Electromagnetic Induction
12	11/16	Properties of Light	11/18	Light Waves
13	11/23	Light Emission	11/25	Thanksgiving – No Class
14	11/30	Light Quanta	12/02	The Atom and the Quantum
15	12/07	The Atomic Nucleus and Radioactivity	12/09	Nuclear Fission and Fusion
16	12/14	Final Exam – 1 to 3 pm	12/16	